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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/615,926	07/10/2003	Hideaki Yamasaki	010986.52578US	9914

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CROWELL & MORING LLP
INTELLECTUAL PROPERTY GROUP
P.O. BOX 14300
WASHINGTON, DC 20044-4300

EXAMINER	
LUND, JEFFRIE ROBERT	
ART UNIT	PAPER NUMBER
1792	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/615,926	YAMASAKI ET AL.	
	Examiner	Art Unit	
	Jeffrie R. Lund	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *30-33,38,40-42,46,49-51 and 53-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *30-33,38,40-42,46,49-51 and 53-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 30-33, 38, 40, 41, 46, 49, 51, and 53-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita et al, JP 2001-214270, in view of Ono, JP 47-10730, Ayers, US Patent 5,925,232, and Mantz et al, US Patent 4,410,273.

Tomita et al teaches a CVD apparatus that includes: a reaction chamber 1 evacuated, to a pressure of less than 667 Pa, by an evacuating system 3 and supporting a substrate 6 on a support 7; a source bottle 16-19 containing a liquid source material and forming a source gas therein as a result of vaporizing caused by a vaporizing gas (Ar) supplied via a first MFC 33-36 and vaporizing gas source line 20-23;

a source gas supply lines 24-27 and 2 supplying said source gas from the source bottles 16-19 to said reaction vessel 1; a diluting inert gas supplied via a second MFC 37 and connected to the source gas supply line 2 at a node (junction of gas supply line 2 and source gas supply lines 24-27); an infrared gas analyzer 46 (including a gas concentration detection unit) located downstream of node (junction of gas supply line 2 and source gas supply lines 24-27) and upstream of the node 11; a bypass gas line 9 connected to the source gas supply line 2 at node 11 via valve 13; and a controller 47 controlling the first MFC 33-36 and second MFC 37, which control the flow rate of the gases as a result of the measurement of the concentration analyzer 46. (Figure, paragraph 20+) The controller of Tomita et al determines the flow rate S of said source gas from a value of Ir of said detection signal according to a relationship S= A x Ir x (1/P) x C and the absolute concentration of said source gas in said mixed gas according to the relationship S/C= A x Ir x (1/P), and is capable of changing the flow rate of the diluting gas while maintaining the vaporizing gas constant.

Tomita et al differs from the present invention in that Tomita et al does not teach that the gas analyzer is inline between the source bottle and node; adjusting the dilution gas flow to maintain the desired concentration in the source gas; that the source gas is $W(CO)_6$; a manometer; or a signal processing unit.

Ono teaches a gas analyzer 27 provided in the source supply line (Figure 2), and controlling the dilution valve 23 and source valve 24 to maintain the proper concentration of the source gas (page 4). The controller of Ono determines the flow rate S of said source gas from a value of Ir of said detection signal according to a

relationship S= A x Ir x (1/P) x C and the absolute concentration of said source gas in said mixed gas according to the relationship S/C= A x Ir x (1/P), and is capable of changing the flow rate of the diluting gas while maintaining the vaporizing gas constant.

Ayers teaches a closed feed back control system that varies the flow of a diluting gas (hydrogen) to maintain the desired concentration of the source gas (Example 5).

Mantz et al teaches a gas analyzer that includes a signal processing unit 58 that receives input (from a manometer 60) and applies a correction to determine an output value (the absolute concentration of a sample). (Figure 1, column 5 line 64 through column 6 line 13)

The motivation for moving the gas analyzer of Tomita et al from a branch line and placing the gas analyzer inline with the gas source supply line, as taught by Ono, is to provide gas to the analyzer more directly, thereby decreasing the response time of the controller and improving the uniformity of the deposited layer. Furthermore, it has been held that the rearrangement of parts is obvious (see *In re Japikse* 86 USPQ 70).

The motivation for adjusting the flow of the dilution gas and/or source gas in the apparatus of Tomita et al is to maintain the concentration of the source gas at the desired amount as taught by Ono et al.

The motivation for adjusting the flow of the dilution gas, while maintaining the flow of the source gas, in the apparatus of Tomita et al is to provide a specific way of controlling the concentration of the source gas as taught by Ayers.

The motivation for supplying $W(CO)_6$ to the reaction vessel of Tomita et al is to deposit a layer containing tungsten on the substrate as is well known in the art.

The motivation for adding a signal processing unit to the apparatus of Tomita et al is to calculate the flow rate and absolute concentration of the sample by receiving an inputs (C, Ir) and applying a correction (i.e. Ax(1/P)) as taught by Mantz et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to move the analyzer of Tomita et al and place it inline with the gas source supply line as taught by Ono; control the flow of the diluting gas to maintain the concentration of the source gas as taught by Ono and Ayers; to supply $W(CO)_6$ to the reaction vessel; and add a manometer and signal processing unit as taught by Mantz et al.

4. Claims 42 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita et al, Ono, Ayers, and Mantz et al as applied to claims 30-33, 38, 40, 41, 46, 49, 51, and 53-55 above, and further in view of Satake et al, JP 2001-234348.

Tomita et al, Ono, Ayers, and Mantz et al differ from the present invention in that they do not teach that the concentration detector is a FTIR.

Satake et al teaches a coating chamber that includes a FTIR concentration detector 20. (Abstract, figure 7)

The motivation for using a FTIR concentration detector in the apparatus of Tomita et al, Ono, Ayers, and Mantz et al is to provide a specific concentration detector as required but only generically disclosed.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the FTIR concentration detector of Satake et al in the apparatus of Tomita et al, Ono, Ayers, and Mantz et al.

5. Claims 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomita et al, Ono, Ayers, and Mantz et al as applied to claims 30-33, 38, 40, 41, 46, 49, 51, and 53-55 above, and further in view of Holst et al, US Patent Application Publication 2003/0056723 A1.

Tomita et al, Ono, Ayers, and Mantz et al differ from the present invention in that they do not teach that the concentration detector is a non-dispersion infrared spectrometer (NDIR).

Holst et al teaches using a NDIR concentration detector 20 to detect a concentration of material in a gas flow. (Paragraph 55)

The motivation for using a NDIR concentration detector in the apparatus of Tomita et al, Ono, Ayers, and Mantz et al is to provide a specific concentration detector as required but only generically disclosed.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the NDIR concentration detector of Holst et al in the apparatus of Tomita et al, Ono, Ayers, and Mantz et al.

Response to Arguments

6. Applicant's arguments filed February 19, 2009 have been fully considered but they are not persuasive.

Applicant argues that Tomita et al, Ono, Ayers, and Mantz et al do not teach calculating the flow rate and absolute concentration of a source, the Examiner disagrees. Tomita et al and Ono both inherently function in the claimed manner. Both apparatus determine an Ir value and apply corrections to the value which must includes

a value for pressure and total flow and take into account the physical properties of the apparatus, and use the corrected value to control the flow of the dilutant gas or the source gas. The absolute concentration must also be calculated in order for the controller to supply the correct amount of source gas to the processing chamber. Ayers functions in the same manner but does not disclose how the concentration is determined. Mantz et al was used to teach a signal processing unit that receives inputs, applies corrections, and outputs a signal to control the apparatus. Furthermore, contrary to Applicant arguments, Tomita et al must obtain the flow rate of an individual source so it can control the individual source. It would not be possible to control the concentration of the mixture if it could not detect and control the individual flow rates and absolute concentrations. Ono functions in a similar manner. Furthermore, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant further argues that Tomita et al, Ono, Ayers and Mantz et al do not teach the feature of claim 30 of "maintaining said flow rate of said vaporizing gas constant" at the time of the controller "decreasing said flow rate of said diluting gas in the event said concentration of said source gas has decreased a lower limit value, the Examiner disagrees. These limitations are function limitations and Tomita et al, Ono, and Ayers are capable of functioning in this manner. Furthermore, it has been held that: claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528, 531, (CCPQ 1959);

"Apparatus claims cover what a device is, not what a device does" (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus "if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-

1437. The examiner can normally be reached on Monday-Thursday (10:00 am - 9:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jeffrie R. Lund/
Primary Examiner
Art Unit 1792

JRL
6/7/09